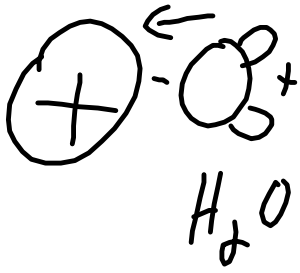
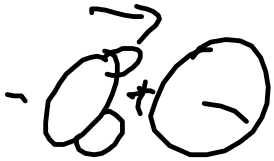
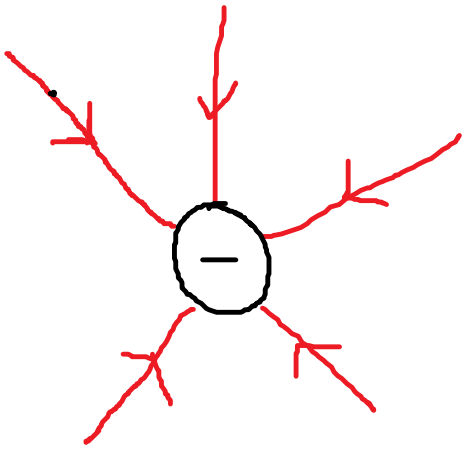
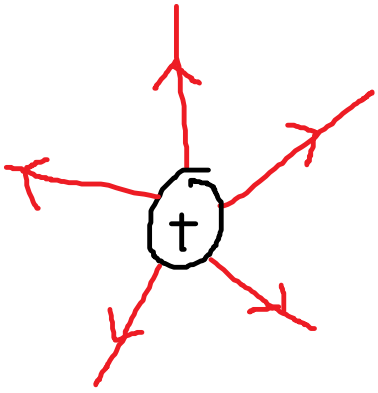
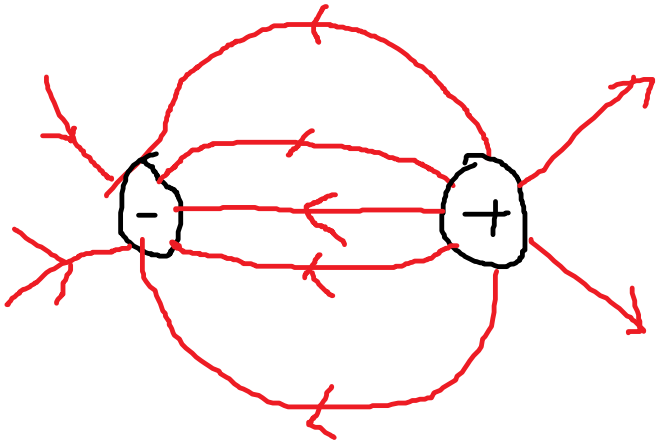


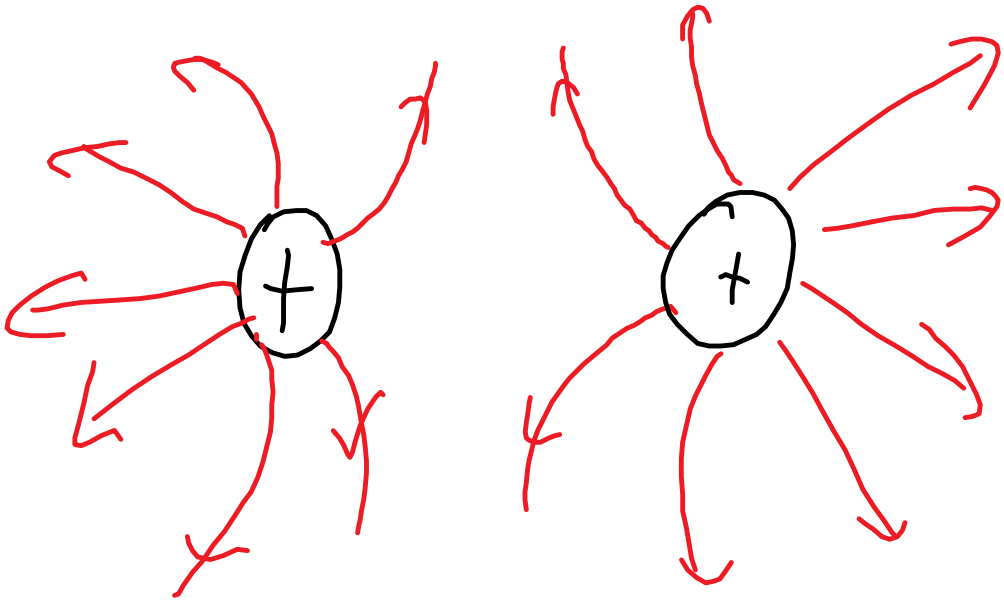
H_2O

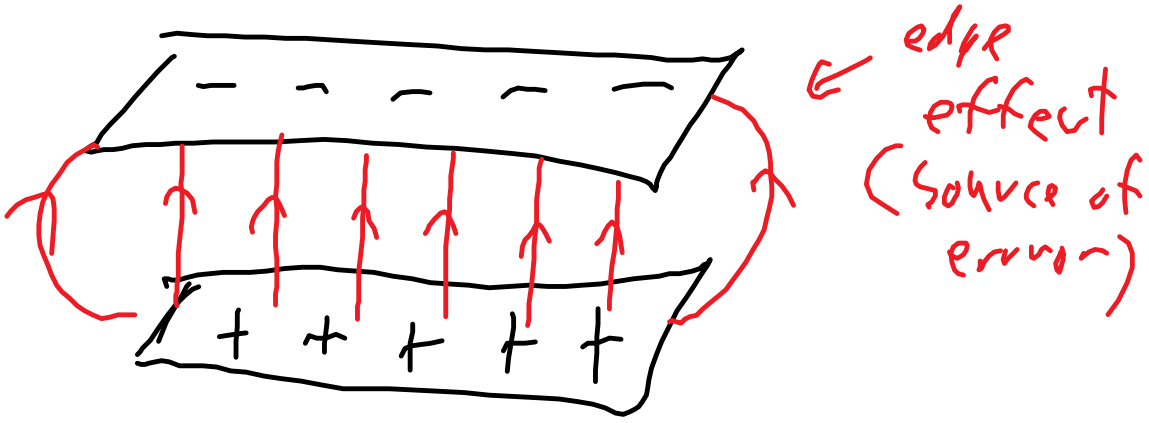












eg. A balloon is charge to 4.0 micro coulombs.

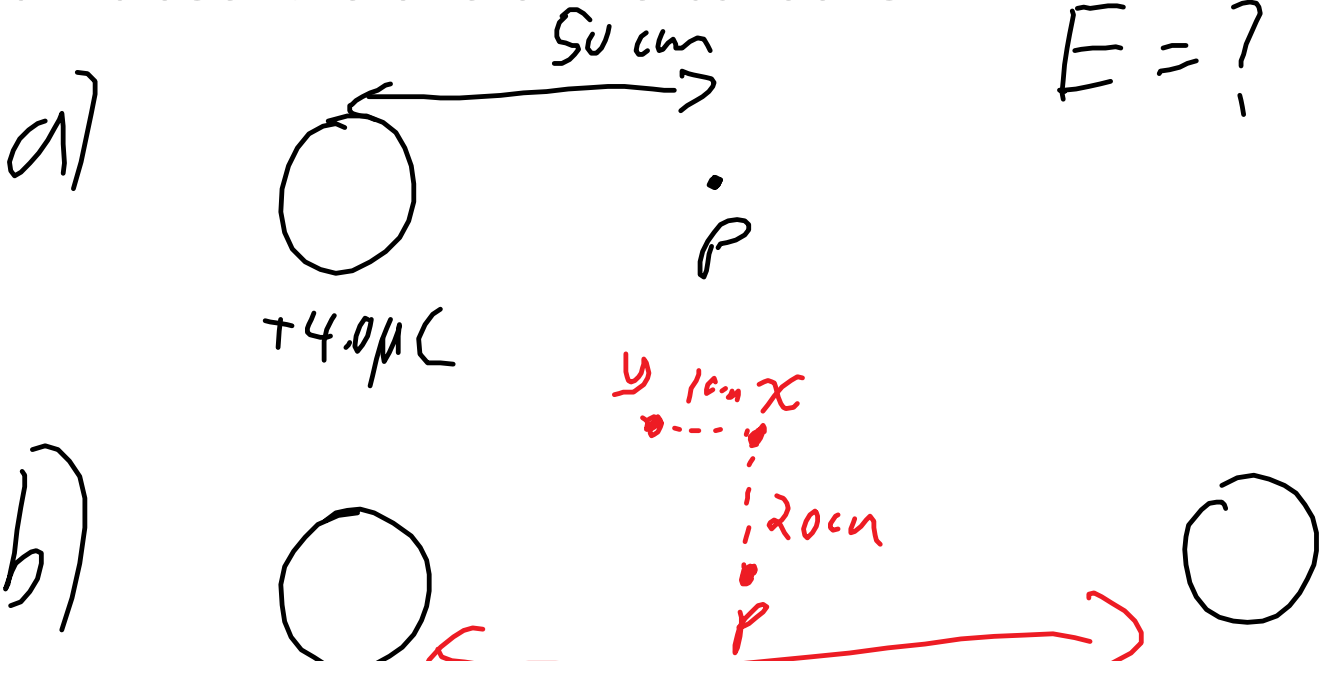
a) What is the electric field strength 50.0 cm from the centre of the balloon?

b) if a second equally charged balloon is placed 1.00 m away, what is the electric field strength

i) directly between them (centre point)

ii) 20.0 cm above the centre point (vectors!)

iii) keeners 20.0 cm above the centre point and 10.0 cm closer the one of the balloons?

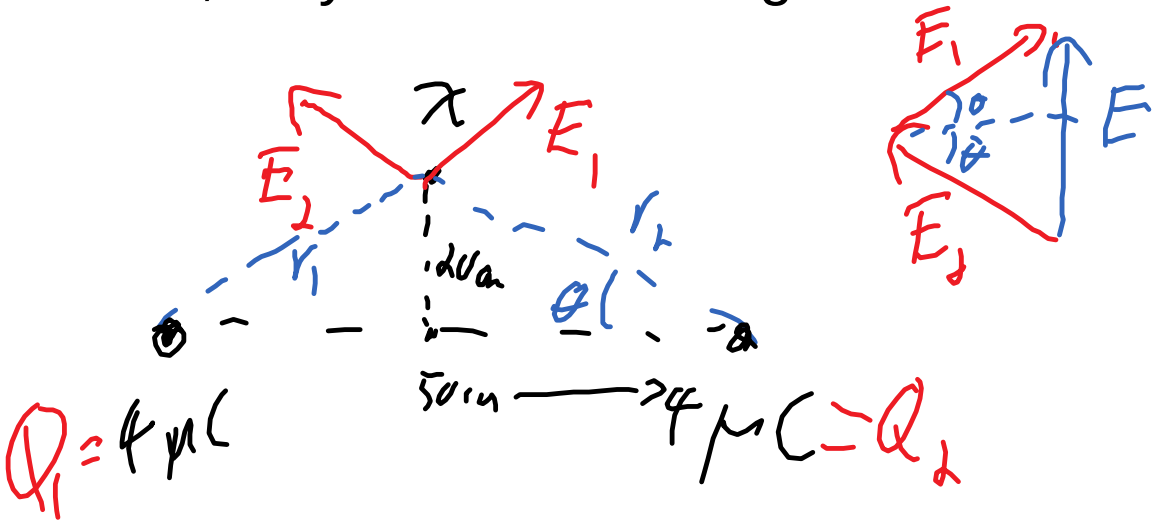


a) $E = kQ/r^2 = 8.99E9x4E\text{-}6/(0.5)^{\wedge}2 = 143,840.0$
$1.4x10^5 N/C$ away from the centre of the charged balloon.

b)

i) E=0 by symmetry - the field from the left charge is $1.4x10^5 N/C$ to the right, the field from the right hand charge is $1.4x10^5 N/C$ to the left, they cancel resulting in no field.

ii)



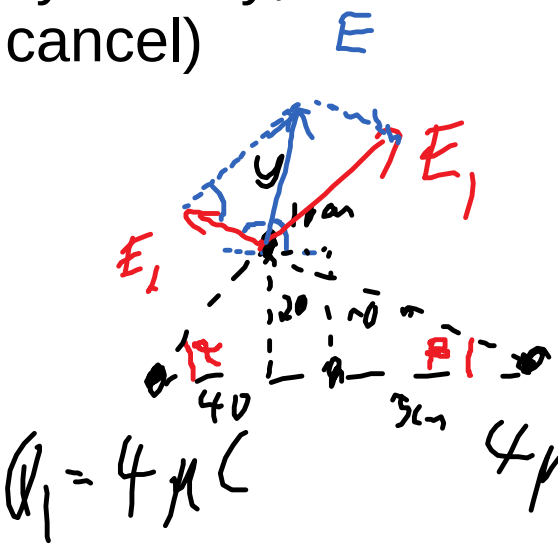
θ = Atan(20/50)=21.80140948635181

$r_1 = r_2 = Sqrt(0.20^{\wedge}2+0.5^{\wedge}2) = 0.53851648071345$

$E_1=E_2 = 8.99E9x4E\text{-}6/(0.538516)^{\wedge}2 = 124,000.221381$

E = 2x124000xSin(21.8014)= 92104.84961174449

9.2 x 10^4 N/C up from midpoint (by symmetry, the horizontal components cancel)



$|E_1| = \frac{KQ_1}{(\sqrt{(0.2^2 + 0.4^2)})^2}$

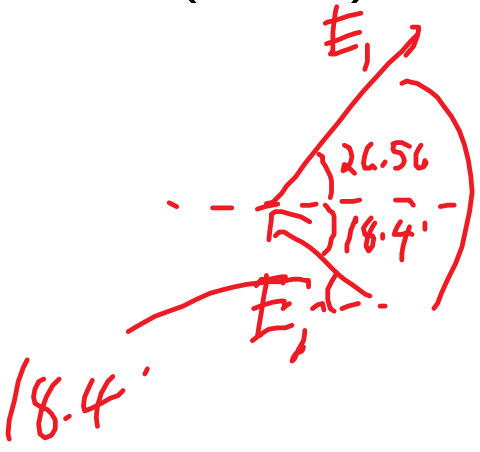
$|E_1| = \frac{8.99 \times 10^9 \; 4 \times 10^{-6}}{0.2^2 + 0.4^2}$

$Q_1 = 4\mu C$ $4\mu C = Q_2$

E_1= 8.99E9x4E-6/(0.2^2+0.4^2)=179,800.0

E_2= 8.99E9x4E-6/(0.2^2+0.6^2)=89,900.0
Atan(20/40)=26.56505117707799

Atan(20/60)=18.43494882292201



26.56 + 18.4 =

26.565+18.4349=44.9999

$b^2 = a^2 + c^2 - 2acCosB$

E = Sqrt(179,800^2+89,900^2-(2x89,900x179800xCos(44.9999)))=132478.805083782

$1.3x10^5 N/C$